

Visions for tomorrow



At the Holcim Forum students from seven colleges around the world presented convincing projects for sustainable construction – and enriched the event with usable ideas.

The participants at the Holcim Forum worked with great concentration. The breaks were generally short, but were also well used – for personal talks between professionals from around the world, and for the Student Poster Competition. 21 students presented their sustainable construction projects on large boards exhibited in an attractive gallery; the Forum participants were asked to assess the projects.

This competition was conducted by the Holcim Foundation and its seven partner universities: Swiss Federal Institute of Technology (ETH Zurich), Switzerland; Massachusetts Institute of Technology (MIT), Cambridge, USA; Tongji University (TJU), Shanghai, China; Ecole Supérieure d'Architecture de Casablanca (EAC), Morocco; Universidad



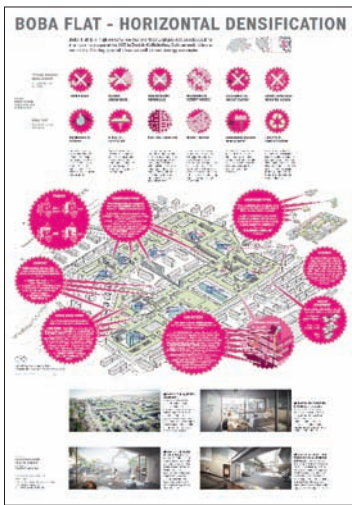
Iberoamericana (UIA), Mexico City, Mexico; Universidade de São Paulo (USP), Brazil; University of the Witwatersrand (Wits), Johannesburg, South Africa.

The tension was high just before Hans-Rudolf Schalcher, who moderated the entire Forum, announced the winners.

Some of these universities had conducted their own internal competitions to select their top students to be invited by the Holcim Foundation to attend the Forum. The “admission fee” was the student poster. The students, some of them working in teams, went to great lengths to complete their projects on time and in an attractive form – and the 270-person jury also faced a great challenge to select the best of the good work.

A welcome side effect of the competition was the interaction between students and professionals; the students took advantage of the opportunity to explain their projects to interested viewers, answer questions, and make new contacts – which in the future will strengthen the effort to achieve sustainable construction.

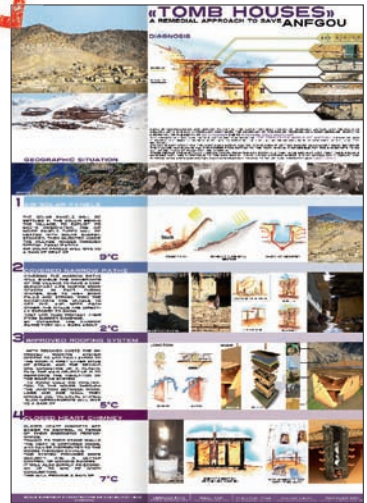
1st



Boba flat – horizontal densification

First prize in the competition went to **Philippe Jorisch** (right), **Forrest Meggers** (left), and Dario Pfammatter. The students from the Swiss Federal Institute of Technology (ETH Zurich), Switzerland, presented an architectural concept for dense development based on horizontal instead of vertical density. The project was elaborated for ABZ Cooperative of Zurich, Switzerland. The presentation board explains six cardinal points of Boba flat: The history of the building remains recognizable, no open areas are wasted, the pattern of space use optimizes the usable area, a lively sequence of micro and macro prevents tedious repetition, energy management is decentralized, and long-term thinking has sway over short-term benefits.

2nd



Tomb houses – a remedial approach to save Anfou

Second prize went to **Issam El Mousghi** (right) from the Ecole Supérieure d'Architecture de Casablanca (EAC), Morocco, for the project "Tomb houses." Anfou is a remote region of Morocco that has no infrastructure; in 2006, twenty six children froze to death during a cold period there. By providing solar panels, better roofs, protected paths between the houses, and enclosed fireplaces, El Mousghi envisions making these houses, built by nomads from the south, weather resistant – with a long-term view to saving lives. – All student poster prizes were presented by **Hans-Rudolf Schalcher**, Head of the Technical Competence Center of the Holcim Foundation (left), and **Rolf Soiron**, Chairman of the Advisory Board of the Holcim Foundation (center).

3rd

PRODUCTION OF RECYCLED SAND FROM CONSTRUCTION AND DEMOLITION WASTE
Carina Ulson, Brazil

THE PROBLEM

- ✓ C&D waste 500-1,000 kg/year/hab.
- ✓ Sao Paulo City 18,000,000 tons/year
- ✓ Aggregates costs [10% to 4 years]
- ✓ Killing of disposal costs
- ✓ Illegal dumping
- ✓ Expensive management USD 11,000,000/year (Sao Paulo)
- ✓ Low recycling rates (ex. 50% world)

SAND MARKET

- ✓ Environmental problems on sand extraction
- ✓ High transportation distances (>100 km) CO₂ emissions, traffic and road abrasion
- ✓ High costs: // is due to transportation

High demand for sand
C&D fine fraction is about 40 to 60% w/w and the recycling rate is insignificant

CHALLENGE AND INNOVATION

APPLY MINERAL PROCESSING TO PRODUCE HIGH QUALITY SAND FROM C&D WASTE

Removal of soil (mostly phases high content of cement residue)

Cost reduction (equipment full 1:1)

FINAL PRODUCT
High Quality Recycled Sand low permeability moderate fines

DEVELOPMENT OF ACCURATE CHARACTERIZATION PROCEDURE

- ✓ Particle size
- ✓ Shape
- ✓ Surface area
- ✓ Water absorption
- ✓ Swelling capacity
- ✓ Content of porous phases

IMPLEMENTATION OF QUALITY CONTROL PROCEDURES

CONCLUSION

COMMUNIZATION

- Production by demand
- Adequate particle size
- Improve particle shape
- Reduce porous phases → 70% 3.0-0.5

MINERAL SEPARATION

- Remove porous phases (low density, high content plaster content)
- Remove fines

CDW RECYCLING IS CRUCIAL FOR SUSTAINABLE CONSTRUCTION

- ✓ Reduction of environmental impacts extraction and dumping
- ✓ Increase the life cycle of construction materials
- ✓ Recycling plants close to the market
- ✓ Reduce transportation distances, costs and CO₂ emission
- ✓ Reduce financing costs
- ✓ Minimize disturbed areas
- ✓ Business opportunity
- ✓ New and valuable market

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Carina Ulson, 4th Prize, 2011
Photo: Henrique Galvão, 4th Prize, 2011



Production of recycled sand from construction and demolition waste

Carina Ulson from the Universidade de São Paulo (USP), Brazil, won third prize with her presentation of how sand can be recycled from construction waste and demolition rubble. She shows how massive problems can be solved by reclaiming the necessary sand from rubble on construction sites. This practice would not only reduce the large volume of waste produced in São Paulo – 500 to 1,000 kilos per person per year – it would reduce the transport of sand, which represents a high cost for the construction industry.



**HIGHLY
COMMENDED**



Channels for learning – a zero-energy campus for impoverished students in Siem Reap, Cambodia

A special prize went to **Siobhan Rockcastle** from the Massachusetts Institute of Technology (MIT), Cambridge, USA. She presented her project for a zero-energy campus in Cambodia. The campus is also conceived to give students with no money an opportunity for academic training. The most important energy-related issues in the region are rainwater distribution and the use of wind. Rockcastle shows how both of these natural resources can be optimally used. The campus is laid out on a north-south axis in response to winds, and the roofs are designed to collect rainwater.



Riparian urbanism – riparian drainage system as urban armature

A further special prize went to **Haley Heard** from the Massachusetts Institute of Technology (MIT), Cambridge, USA, for her presentation on urbanism and riparian land. Ninety percent of the world's large cities are situated in riparian areas – locations that are strategically important but usually environmentally sensitive. Heard shows how the water could be used in such a way that natural habitats for flora and fauna would remain protected. At the same time, floods could be better controlled and epidemics prevented by maintaining existing natural systems and their mechanisms instead of replacing them with artificial systems.